Claims

[c1]   1. A computer implemented method for enabling at least one of field service of machines and training of field service personnel comprising:

generating at least one validated sequence of actions for at least one maintenance task;

validating said at least one sequence in a virtual environment; and,

delivering said at least one validated sequence for use in performing said at least one maintenance task.

[c2]   2. The method of claim 1 wherein the delivering step comprises providing natural language instructions

[c3]   3. The method of claim 2 wherein said natural language instructions comprises at least one of written instructions, voice instructions and animated exploded view video instructions.

[c4]   4. The method of claim 1 wherein the generating step imports engineering data comprising a Computer Aided Design (CAD) model.

[c5]   5. The method of claim 1 wherein the generating step comprises:

importing said engineering data;

determining mating interfaces of a plurality of component parts within a given assembly;

creating at least one component part removal path for at least one of said component parts; and,

generating said at least one sequence of instructions responsive to said creating step.

[c6]   6. The method of claim 5 further comprising repeating said generating step to generate a plurality of sequences.

[c7]   7. The method of claim 1 wherein said validating step is performed with a haptic interface.

[c8]   8. A computer implemented method for enabling at least one of field service of machines and training of field service personnel comprising:

generating at least one sequence of actions for at least one maintenance task;

validating said at least one sequence can be performed by said field service personnel; and,

delivering said at least one sequence for use in performing said at least one maintenance task.

[c9]   9.The method of claim 8 wherein the validating step provides feedback to the generating step.

[c10]   10.The method of claim 8 wherein the delivering step comprises providing written instructions.

[c11]   11.The method of claim 8 wherein the delivering step comprises providing alternate instruction presentation such as voice instructions.

[c12]   12.The method of claim 8 wherein the delivery step comprises providing animated exploded view video instructions.

[c13]   13.The method of claim 8 wherein the generating step imports engineering data comprising a Computer Aided Design (CAD) model.

[c14]   14.The method of claim 8 wherein said validating step is performed in a virtual environment.

[c15]   15.The method of claim 8 wherein said validating step is performed with a haptics interface.

[c16]   16.The method of claim 8 wherein the generating step comprises:
imporing engineering data from a Computer Aided Design (CAD) model;
determining mating interfaces of a plurality of component parts within said CAD model;
creating at least one component part removal path for at least one of said component parts in a given exploded view; and,
generating said at least one sequence of instructions responsive to said creating step.

[c17]
17.The method of claim 16 further comprising repeating said generating step to

generate a plurality of sequences.

[c18]   18.A system for enabling at least one of field service of machines and training of field service personnel comprising:

an engineering data generating device adapted to compute and provide engineering data relating to said machines;

a service sequence generator adapted to import and process said engineering data to generate at least one sequence of instructions for at least one maintenance task;

an automated generating device adapted to convert said at least one sequence of instructions into natural language instructions for use in said at least one maintenance task;

a validating device adapted to verify said natural language instructions; and,

a delivery device adapted to deliver said natural language instructions to said field service personnel.

[c19]   19.The system of claim 18 wherein said engineering data generating device is a Computer Aided Design (CAD) system and said engineering data comprises at least one of CAD models and engineering drawings.

[c20]   20.The system of claim 18 wherein said automated generating device produces human-readable instructions for said maintenance tasks.

[c21]   21.The system of claim 18 wherein said human-readable instructions comprise at least one of written instructions, voice instructions and animated exploded view video instructions.

[c22]   22.The system of claim 18 wherein said validating device comprises a haptics device.

[c23]   23.The system of claim 18 wherein said service sequence generator is further adapted to generate a plurality of collision-free part removal paths for said at least one sequence of instructions.

[c24]   24.The system of clam 18 wherein said delivery device is further adapted to permit said service personnel to select a desired format for said instructions.

[c25]   25.The system of claim 24 wherein said format comprise at least one of written instructions, voice instructions and animated exploded view video instructions.